

**A New *Pentalitomastix* from México**

(Hymenoptera : Encyrtidae)

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From late spring to late summer 1963, I searched extensively for natural enemies of the navel orangeworm, *Paramyelois transitella* (Walker) (Lepidoptera : Phycitidae), in México. Among several species of parasites, I found a polyembryonic encyrtid occurring in most areas where the host was collected.

A critical examination of the encyrtids showed they did not fit comfortably in any of the genera included in the keys published by Mercet (1921), Ferrière (1953), De Santis (1965), and Peck *et al.* (1964). On consultation with Dr. O. Peck, he placed this species in the genus *Pentalitomastix* Eady. This determination was confirmed when I had the opportunity to examine specimens of *Pentalitomastix nacoiae* (Eady), the type of the genus. I consider the species as an undescribed one, and the name proposed for it and its description is presented here.

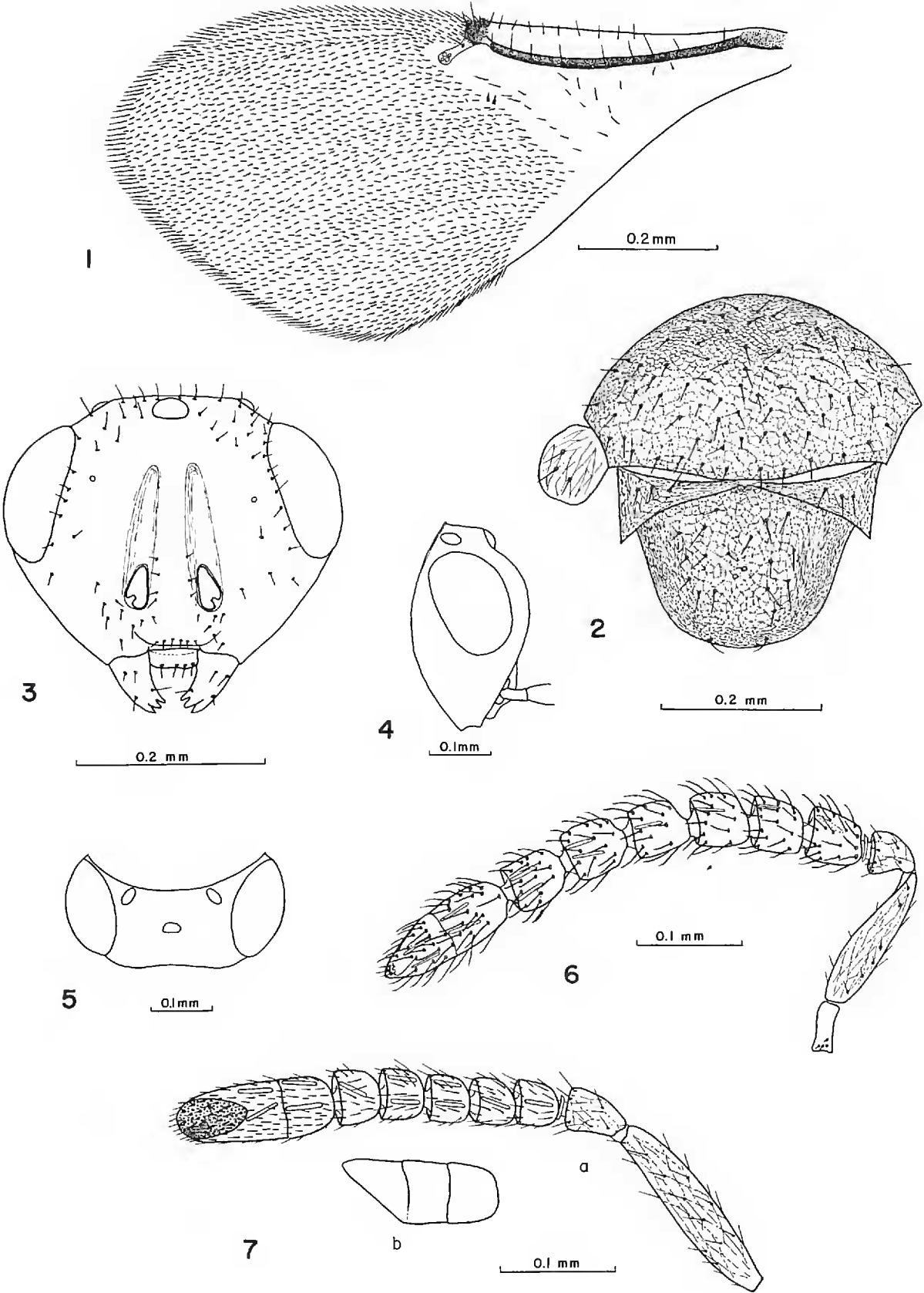
The study of morphological characters in small chalcids (1 mm or less) is a difficult one, as no single method for preparing specimens for examination is entirely satisfactory from the taxonomist's point of view. Specimens for examination were mounted either on paper points, or on slides. On the slides a number of specimens were mounted whole, others were dissected. Some slides were prepared following Quednau (1964); other specimens were cleared in 5% KOH and then mounted in either gum dammar, or in the gum-arabic medium prepared according to Hille Ris Lambers (1950).

The point-mounted specimens were examined with a Leitz stereo microscope at magnifications up to 96 ×, using an incandescent lamp illuminator with a blue ground glass filter. The slide-mounted specimens were examined with a Tiyoda compound microscope at magnifications up to 600 ×. For measuring structures specimens that were comparably oriented on the slides were selected. The measurements are relative, except for the length of the specimens which is measured in mm. Three figures are given for each measurement: the first indicates the average; the following two, in parentheses, indicate the range.

***Pentalitomastix plethoricus* Caltagirone, new species**

(Figs. 1-8, 10)

FEMALE.—Length of the holotype 0.90 mm, varying from 0.80 to 0.91 mm in 28 other specimens.



Figs. 1-7. *Pentalitomastix plethoricus*. 1, forewing; 2, mesonotum; 3-5, head; 6, male antenna; 7a, female antenna, internal lateral view; 7b, club of same, dorsal view.

*Head* height 0.885 (0.840–0.980) width; *genae* 0.717 (0.690–0.770) longest diameter of eye; distance from antennal sockets to oral margin 0.67 (0.57–0.80) distance between antennal sockets, these below level of lower margin of eyes; *ocelli* in an obtuse triangle, orbit-ocellar distance shorter than longest diameter of lateral ocelli, these very close to occipital margin; *labrum* length 0.291 (0.264–0.324) its width, with three to six apical setae; *mandibles* three-toothed, as in Fig. 10; *eyes* sparsely hairy; reticulation mostly scaly. *Antennae* 11-segmented, *counting ring segment*; *scape* length 4.76 (3.98–5.25) times its width, flattened on ventral side towards apex; *pedicel* length 0.296 (0.260–0.344) length of scape, width at apex 0.795 (0.705–0.852) its length; scape and pedicel with elongate, polygonal reticulation; *ring segment* small, appressed to first funicular segment; *funicle* five-segmented, all segments wider than long; length of first funicular segment 0.787 (0.733–0.827) length of pedicel; rest of funicular segments as long as or slightly shorter than first; *club* three-segmented, its length 0.744 (0.643–0.803) length of funicle, long ovate, 2.55 (2.24–2.93) times longer than wide, obliquely truncate at apex, truncature towards sagittal plane, suture between second and apical club segments not discernible from certain angles.

*Thorax* as wide as head; *pronotum* with about 14 setae along posterior margin, about 20 shorter ones on disc, finely scaly reticulate; *mesoscutum* finely reticulate with about 85 setae; *axillae* barely touching each other, reticulate, with two or three discal setae; *scutellum* strongly convex, polygonally reticulate, with about 18 discal setae, two apical setae curved and more erect than rest; *tegulae* orbicular or short oval.

*Forewings* length 2.06 (2.0–2.14) times the width, hyaline; *submarginal* 0.47 (0.40–0.50) length of wing, with about nine setae; *marginal* punctiform; *post-marginal* not discernible; *stigma* slightly longer than marginal, gradually widening towards apex; hairs on disc as in Fig. 1.

*Middle tibial spur* 1.05 (1.00–1.08) length of middle basitarsus.

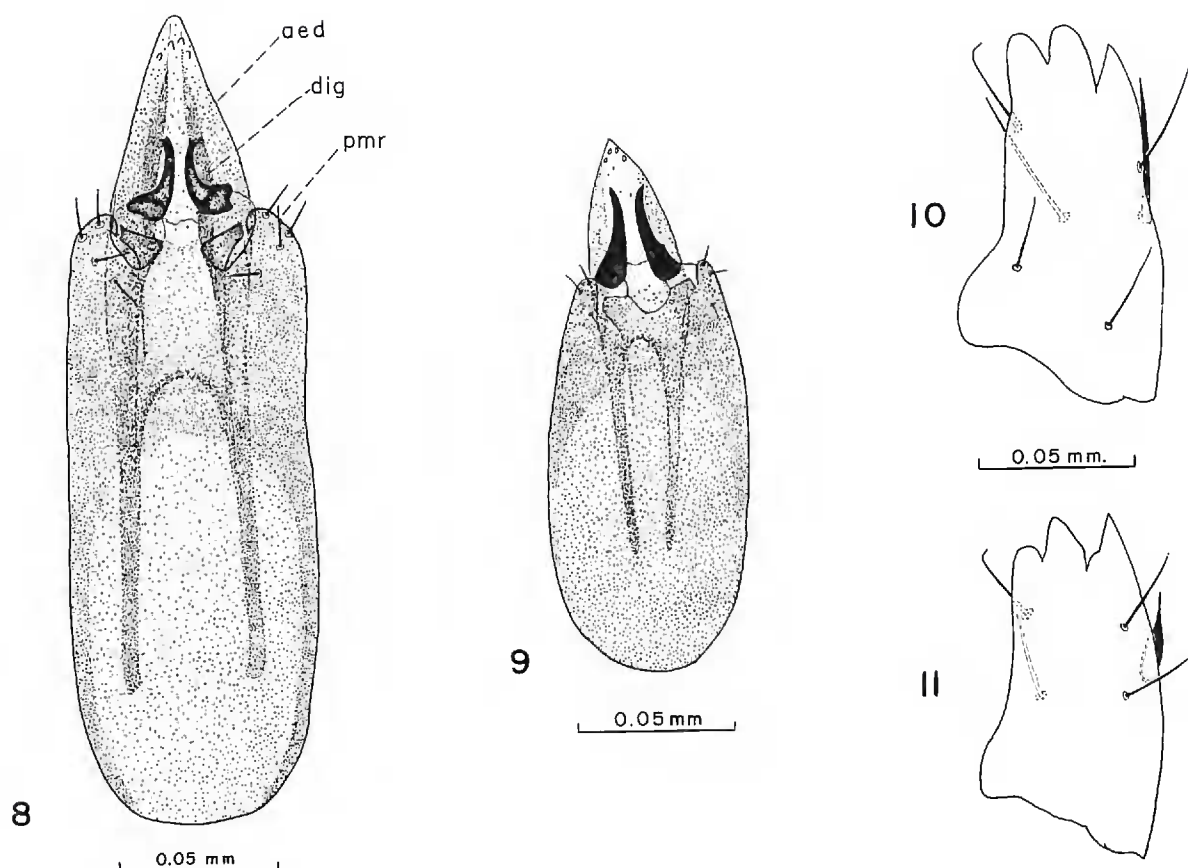
*Abdomen* ovate, slightly narrower than thorax; ovipositor barely visible.

Black, somewhat brownish on venter, head, and thorax above with purple reflections, mesoscutum with additional bluish-greenish reflections; eyes and ocelli red; mandibles, except teeth, apex of coxae, trochanters, base of femora testaceous; teeth of mandibles dark brown; antennae with yellowish hue; apex of femora, extreme base and apex of tibiae, first four tarsal segments, and tibial spurs white; submarginal and marginal veins black, stigmal vein hyaline, colorless.

MALE.—Length varying from 0.88 to 1.06 mm in 21 specimens. Similar to female, differing as follows: distance of antennal sockets to oral margin 0.88 (0.78–1.00) distance between antennal sockets; *antennae* 12-segmented, *counting ring segment*; *pedicel* length 0.33 (0.31–0.35) length of scape; *funicle* six-segmented, all funicular segments longer than pedicel, about as long as wide; *club* as long as two funicular segments together, as wide as funicle, divided by a transverse septum (this character not seen in some of the slide-mounted specimens); genitalia as in Fig. 8.

*Holotype female* selected from a series reared from a larva of *Paramyelois transitella* in a ripe pod of *Tamarindus indica*; TEHUANTEPEC, OAXACA, MÉXICO; host collected 21 July 1963. Specimen cleared in KOH and mounted whole in gum dammar.





Figs. 8-9. Male genitalia, ventral view. 8, *Pentalitomastix plethoricus*. aed, aedeagus; dig, digitus; pmr, paramere. 9, *P. nacoieiae*.

Figs. 10-11. Right mandible. 10, *P. plethoricus*. 11, *P. nacoieiae*.

PARATYPES.—Numerous females reared from the same individual host as holotype, presumably these specimens developed from the same egg as the holotype, labeled "series of the holotype." Numerous males, same locality, date, and host as holotype. Numerous males and females reared from *P. transitella* larvae in pods of *Pithecolobium flexicaule*, Manuel, Tamaulipas, elevation 250 feet, hosts collected 25 May 1963. Numerous males reared from larvae of *P. transitella* in ripe fruits of *Sapindus saponaria*, Tlalixtac, Oaxaca, elevation 5,100 feet, hosts collected 8 July 1963. Numerous females reared from *P. transitella* in ripe fruits of *S. saponaria*, Huichihuayán, San Luis Potosí, elevation 500 feet, host collected 26 May 1963. All types collected by L. E. Caltagirone.

Holotype and paratypes in the collection of the Division of Bioloical Control, University of California, Berkeley. Paratype series consisting of both slide-mounted and point-mounted specimens deposited at the United States National Museum, Washington, D. C., Canadian National Collection, Canada Department of Agriculture, Ottawa and British Museum (Natural History), London.

Additional material examined: 22 females, part of the series of specimens reared from a *Laspeyresia caryana* larva on pecan, Villa de García, Nuevo León, México, March 1964 (H. Guajardo).

BIOLOGICAL OBSERVATION.—*Pentalitomastix plethoricus* is a polyembryonic egg-larval parasite. The egg is laid in the host's egg, and a polygerm, from which large numbers of larvae originate, develops in the host larva. The parasites complete their larval development after the host spins the cocoon. Pupation occurs in the host's remains. Normally either females or males will emerge from a single host. As many as 1,200 individuals have been reared from a larva of *P. transitella*.

This parasite is being released in several areas of the San Joaquin Valley in California in an attempt to control the navel orangeworm. It has been referred to as *Holcothorax* sp. in the literature (Caltagirone *et al.*, 1964).

SYSTEMATICS.—In 1960 Eady described the monobasic genus *Pseudolitomastix* with *Pseudolitomastix nacoleiae* the included species. The species had been reared from larvae of the pyralid *Nacoleia octasema* (Meyr.) from Lae, New Guinea. Later, Eady (1960) proposed the new name *Pentalitomastix* for *Pseudolitomastix* Eady which was preoccupied by *Pseudolitomastix* Risbec 1954. In 1960 Hoffer described the second species of *Pentalitomastix*, *P. bohemicus*, from a single female specimen collected near Tábor, Czechoslovakia.

*Pentalitomastix plethoricus* can be distinguished from the other species in the genus by characters in the following key.

#### KEY TO THE SPECIES OF PENTALITOMASTIX

1. Club of female and male antennae entire (male unknown in *bohemicus*), first funicular segment of female longer than wide ..... 2  
Club of female antenna three-segmented, of male transversely septate; first funicular segment of female at most as long as wide .... *plethoricus* Caltagirone
2. Ocelli in a right-angled triangle; orbit-ocellar distance shorter than greatest diameter of lateral ocellus; head and mesoscutum green, scutellum purple with green apex ..... *nacoleiae* Eady  
Ocelli in an obtuse-angled triangle; orbit-ocellar distance longer than greatest diameter of lateral ocellus; entire body pitch black ..... *bohemicus* Hoffer

*Pentalitomastix plethoricus* can be further distinguished from *P. nacoleiae* by the mandibles (Figs. 10–11) and the male genitalia (Figs. 8–9).

Specimens of *P. plethoricus* key out with difficulty towards several different genera in some of the published keys, none of which include *Pentalitomastix*. In Mercet (1921) the females key towards *Agéniaspis* (*Holcothorax*) and the males towards *Copidosoma*. In Ferrière (1953) the females run towards *Holcothorax* while the males run towards *Paraphycus* (for *Paraphycus* the males are unknown). In Peck *et al.*

(1964) the females key out towards *Hungariella* while the males do so towards *Copidosoma*. In De Santis (1965) the females run towards *Hungariella* and the males towards *Arrenoclavus*.

The females of *P. plethoricus* differ from the species belonging in *Hungariella* by the three-toothed mandibles, the punctiform marginal vein, and the four-segmented maxillary and three-segmented labial palpi. From *Holcothorax* they differ by the undiscernible postmarginal vein and the polygonally reticulate sculpturing of the scutum and scutellum. The males of *P. plethoricus* differ from *Copidosoma* by the septate antennal club, and the characters in the external genitalia. From *Arrenoclavus* they differ by the characters in the external genitalia.

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#### LITERATURE CITED

- CALTAGIRONE, L. E., K. P. SHEA, AND G. L. FINNEY. 1964. Parasites to aid control of navel orangeworm. Calif. Agric., 18 (1): 10-12.
- DE SANTIS, L. 1965 (1963). Encírtidos de la República Argentina (Hymenoptera: Chalcidoidea). An. Com. Inv. Cient. Prov. Bs. Aires (Argentina), 4: 9-422.
- EADY, R. D. 1960. A new genus and two new species of Encyrtidae (Hymenoptera, Chalcidoidea) from the banana scab moth, *Nacoleia octasema* (Meyr.). Bull. Entomol. Res., 50: 667-670.
1960. *Pentalitomastix*, a new name for *Pseudolitomastix* Eady (Hymenoptera, Chalcidoidea). Bull. Entomol. Res., 51: 173.
- FERRIÈRE, CH. 1953. Encyrtides paléarctiques (Hym. Chalcidoidea). Mitt. Schweiz. Entomol. Ges., 26 (1): 1-45.
- HILLE, RIS LAMBERS, D. 1950. On mounting aphids and other soft-skinned insects. Entomol. Ber. Amst., 13: 55-58.

- HOFFER, A. 1960. A revision of the Czechoslovak genera of the subfamily Encyrtinae with a reduced number of funicle segments. Acta. Faun. Entomol. Mus. Nat. Prague, 6: 93-119.
- MERCET, R. G. 1921. Fauna Ibérica. Himenópteros, Fam. Encírtidos. Inst. Nac. Ciencias, Mus. Nac. Cienc. Nat. (Madrid) x + 732 p.
- PECK, O., Z. BOUČEK, AND A. HOFFER. 1964. Keys to the Chalcidoidea of Czechoslovakia (Insecta: Hymenoptera). Mem. Entomol. Soc. Canada, No. 34, 120 p.
- QUEDNAU, F. W. 1964. A contribution on the genus *Aphytis* Howard in South Africa (Hymenoptera: Aphelinidae). J. Entomol. Soc. So. Afr., 27 (1): 86-116.
- RISBEC, J. 1954. Chalcidoides et Proctotrupides de l'Afrique tropicale française (4e supplément). Bull. Inst. Franç. Afr. Noire (A), 16: 1035-1092.

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## The Genus *Callidiellum* in North America

(Coleoptera : Cerambycidae)

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The genus *Callidiellum* Linsley (1940) has been known from North America previously by but a single species, *C. cupressi* (Van Dyke), the type of the genus. Two additional species occur in eastern Asia, *C. rufipenne* (Motschulsky) in Japan and adjacent areas, and *C. villosulum* (Fairmaire) in eastern China (Linsley, 1958). All three are associated with trees of the Taxodiaceae-Cupressaceae, *Callidiellum cupressi* with Sargent cypress, *Cupressus sargentii* Jeps. (or *goveniana* Gord.), *Callidiellum rufipenne* with *Cryptomeria japonica* D. Don. (principally) and *Chamaecyparis obtusa* Sieb. Zuce. and *Callidiellum villosulum* with *Cunninghamia lanceolata* Hook. This type of discontinuous distributional relationship between East Asiatic-Western North American biotic elements is evident among genera in several tribes of Cerambycidae (Linsley, 1939b, 1942, 1958, 1959, 1961, 1963). Most of these were presumably associated with the Arcto-Tertiary Geoflora (Axelrod, 1960). In view of the biogeographic significance of this discontinuously distributed host-specific group, we offer a description of a new species of *Callidiellum* from Arizona associated with *Cupressus glabra* Sudw.

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